REMARKS

This correspondence is filed in reply to the Office Action mailed on December 22, 2003. Claim 28 is amended, no claims are canceled, and no claims are added. As a result, claims 1-28 are now pending in this Application.

§*101 Rejection of the Claims*

Claim 28 was rejected under 35 USC § 101 as being directed to non-statutory subject matter. The Applicants agree that "merely claiming nonfunctional descriptive material stored in a computer-readable medium does not make the invention eligible for patenting." See *Arrhythmia*, 958 F.2d at 1057. However, as noted in the Office Action, claim 28 in its original form (and as amended) is directed to claiming a medium, and not just the material stored thereon. Nevertheless, claim 28 has been amended to more precisely follow the recommendation set forth in the Office Action while retaining the essential character of "a computer-readable medium having computer-executable instructions," and not for reasons related to patentability. Therefore, the concerns of the Examiner should be resolved, and the Applicants respectfully request that this rejection under 35 USC § 101 be reconsidered and withdrawn.

§*103 Rejection of the Claims*

Claims 1, 10, 14, 16-18, 21, 24 and 28 were rejected under 35 USC § 103(a) as being unpatentable over Rezek et al. (U.S. Patent No. 5,956,256, hereinafter "Rezek") in view of Hollstein et al. ("HiPART", Proceedings of the 6th International Workshop on Hardware/Software Codesign, 5 pgs., March 1998, hereinafter "Hollstein"). First, the Applicants do not admit that Rezek or Hollstein are prior art, and reserve the right to swear behind these references in the future. Second, since a *prima facie* case of obviousness has not been established as required by M.P.E.P. § 2142, the Applicants respectfully traverse this rejection.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). In combining prior art references to construct a *prima facie* case, the Examiner must show some objective teaching in the prior art or some knowledge generally available to one of ordinary skill

in the art that would lead an individual to combine the relevant teaching of the references. *Id.* The M.P.E.P. contains explicit direction to the Examiner that agrees with the *In re Fine* court:

> In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d (BNA) 1438 (Fed. Cir. 1991)).

An invention can be obvious even though the suggestion to combine prior art teachings is not found in a specific reference. *In re Oetiker*, 977 F.2d 1443, 24 U.S.P.Q.2d (BNA) 1443 (Fed. Cir. 1992). However, while it is not necessary that the cited references or prior art specifically suggest making the combination, there must be some teaching somewhere which provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem which the claimed invention addresses. One of ordinary skill in the art will be presumed to know of any such teaching. (See, e.g., *In re Nilssen*, 851 F.2d 1401, 1403, 7 U.S.P.Q.2d 1500, 1502 (Fed. Cir. 1988) and *In re Wood*, 599 F.2d 1032, 1037, 202 U.S.P.Q. 171, 174 (C.C.P.A. 1979)). The requirement of a suggestion or motivation to combine references in a *prima facie* case of obviousness is emphasized in the Federal Circuit opinion, *In re Sang Su Lee*, 277 F.3d 1338; 61 U.S.P.Q.2D 1430 (Fed. Cir. 2002), which notes that the motivation must be supported by evidence in the record.

No proper *prima facie* case of obviousness has been established in this case because (1) no combination of the references teaches all the limitations set forth in the claims, (2) there is no reasonable expectation of success if the references are combined, and (3) there is no motivation to combine the references. Each of these points will be explained in detail, as follows.

The References Do Not Teach All Claim Limitations. It is admitted in the Office Action that Rezek does not "disclose partitioning the latches into a plurality of partitions or maintaining a load balance within the plurality of partitions." It should also be noted that Rezek does not teach the fundamental concept of an "extended latch boundary component" (ELBC), its use, and/or manipulation, as claimed by the Applicants.

The Application states:

> An elementary latch boundary component contains a single output and no internal latches. An extended latch boundary component, in one embodiment, is formed by clustering elementary latch boundary components, and in contrast with an elementary latch boundary component, an extended latch boundary component may contain an internal latch. In one embodiment, extended latch boundary component 103 includes latches 112 and 115 and primary inputs 118 and 121. Extended latch boundary component 109 includes latch 124 and inverter 127. In an alternate embodiment, an extended latch boundary component is formed by selecting a path having a first node that is either a latch or a primary output, a second node that is either a latch or a primary input, and a latch between the first node and the second node. Application, pg. 3, lines 4-13.

As a matter of distinction, the passages and figures of Rezek cited in the Office Action illustrate what is needed to provide qualified clock signals between modules to correctly optimize multi-cycle paths. To accomplish this goal, clocks associated with multi-cycle paths (those paths having propagation times longer than the clock period) are identified and replaced. See Rezek, Col. 4, lines 26-37.

Thus, the circuits of Rezek are not decomposed into ELBC components, nor does Rezek operate to partition ELBC components. Rezek teaches identification and modification of multi-cycle paths in circuits, which is a completely different concept. The elements of merging ELBCs, grouping ELBCs, forming ELBCs, and mapping ELBCs, as claimed by the Applicants in independent claims 1, 10, 14, 16-17, 21, 24, and 28, are also not disclosed by Rezek.

Hollstein speaks to the tradeoffs involved with design projects that include a mix of hardware and software components. "Partitioning", as described by Hollstein, means the allocation of various design functional elements between software and hardware. See Hollstein, parts 2 and 4.3. Thus, ELBCs, their use and manipulation, are also not described by Hollstein. Therefore, no combination of Rezek and Hollstein can be used to repair the deficiencies admitted in the Office Action, or to teach decomposition of circuits into ELBCs, partitioning of ELBCs,

merging ELBCs, grouping ELBCs, forming ELBCs, and mapping ELBCs, as claimed by the Applicants in independent claims 1, 10, 14, 16-17, 21, 24, and 28.

Finally, with respect to independent claim 18, the elements of "expanding the repeated circuit structure once to form an expanded circuit structure" and "grafting the expanded circuit structure" are not disclosed by either Rezek or Hollstein. Therefore, no combination of Rezek and Hollstein can provide these missing elements with respect to claim 18.

There Is No Reasonable Expectation of Success. Combining Rezek and Hollstein does not achieve or advance the goals of either system. Rezek is concerned with the identification and adaptation of multi-cycle paths for proper simulation results. Hollstein is concerned with reducing the cost of designs according to tradeoffs effected between hardware and software. Rezek does not mention the division of designs into hardware and software components; merely the use of modified clock signals in certain hardware designs to provide more accurate simulation results. Adding the partitioning capability of Hollstein does nothing to improve the clocking simulations described by Rezek. See Rezek, Col. 12, line 7 - Col. 13, line 5.

Similarly, Hollstein does not mention the existence of multi-cycle clocks; merely the allocation of hardware and software elements within a system. Adding modified multi-cycle clocks (taught by Rezek) does nothing to enhance the process of simulated annealing disclosed by Hollstein. See Hollstein, part 4.3.

Finally, neither Rezek nor Hollstein mentions, describes, or teaches the use of ELBCs in any way. Therefore, combining Rezek and Hollstein does not convey a reasonable expectation of success in either case.

There Is No Motivation to Combine the References. As mentioned previously, the use and manipulation of ELBCs is not mentioned by either Rezek or Hollstein. However, it is asserted in the Office Action that "an ordinary artisan would have been motivated to search the behavioral simulation art in order to overcome the express deficiencies of the references in regards to a dice partitioning tool, to find methods to simulate multi-cycle paths in high performance systems," and that "it would have been obvious ... to have modified the boundary latch modeling and simulation methods of the Rezek et al. reference with the partitioning methods of the Hollstein et al. reference." The Applicants respectfully disagree.

First, the "dice" partitioning tool described by Hollstein refers to Darmstadt Interactive Codesign of Embedded Systems (DICE). The HiPART component of Hollstein's article forms a part of DICE, and permits determining the cost of allocating various parts of a design to either hardware or software. There is no need to simulate multi-cycle paths within HiPART, since this tool is concerned with hardware/software co-design, and not low-level clocking analysis. Thus, modification of Hollstein to introduce the identification and modification of multi-cycle paths described by Rezek is ineffective, since Hollstein is wholly unconcerned with this type of hardware operational detail, and therefore, Hollstein teaches away from combination with Rezek.

Second, Rezek is concerned with clock signal propagation between hardware modules. Rezek, in turn, teaches away from combination with Hollstein, since the additional partitioning operations introduced by Hollstein would take unnecessary time and do nothing to improve multi-cycle path simulation results. Thus, to modify Rezek to use the hardware/software partitioning algorithms of Hollstein, as suggested in the Office Action, defeats the purpose of Rezek.

The test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 U.S.P.Q. (BNA) 543, 551 (Fed. Cir. 1985). If the proposed modification renders the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *M.P.E.P.* § 2143.01 (citing *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984)). The Examiner must also avoid hindsight. *Id.* The Examiner cannot use the Appellant's structure as a "template" and simply select elements from the references to reconstruct the claimed invention. *In re Gorman,* 933 F.2d 982, 987, 18 U.S.P.Q.2d (BNA) 1885, 1888 (Fed. Cir. 1991). Since modifying Rezek to make use of Hollstein's hardware/software allocation analysis provides no benefit, and is in fact detrimental, there is no motivation to combine these references.

Finally, there is no evidence in the record to support the assertion by the Office that "it would have been obvious ... to have modified the boundary latch modeling and simulation methods of the Rezek et al. reference with the partitioning methods of the Hollstein et al reference." This is because neither reference describes the use and/or manipulation of HLBCs.

This use of an unsupported assertion does not satisfy the explicit requirements set forth by the *In re Sang Su Lee* court. Thus, the Examiner appears to be using personal knowledge, and is therefore respectfully requested to submit an affidavit as required by 37 C.F.R. § 1.104(d)(2).

In summary, a *prima facie* case of obviousness has not been established by the combination of Rezek and Hollstein. No combination of the references provides the elements claimed by the Applications, especially with respect to HLBCs, there is no reasonable expectation of success if the references are combined, and there is no motivation to combine the references. Therefore, it is respectfully asserted that no proper combination of Rezek or Hollstein can be made to disclose the embodiments claimed, and it is respectfully requested that the rejection of claims 1, 10, 14, 16-18, 21, 24 and 28 under 35 U.S.C. §103 be reconsidered and withdrawn.

Allowable Subject Matter

The Applicants note with appreciation that claims 2-9, 11-13, 15, 19, 20, 22, 23 and 25-27 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Given the reasoning set forth above, these claims should be in condition for allowance without amendment. Reconsideration is respectfully requested.

CONCLUSION

The Applicants respectfully submit that all of the pending claims are in condition for allowance and notification to that effect is earnestly requested. If the Examiner is not firmly convinced of the major differences existing between what is claimed by the Applicants and what is taught by Rezek and Hollstein, the Applicants respectfully request an interview with the Examiner. The Examiner is invited to telephone the Applicants' attorney, Mark Muller at (210) 308-5677, or the undersigned at (612) 349-9592 to facilitate prosecution of this Application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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Date Feb. 23, 2004

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 23rd day of February 2004.

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